CONSTRUCTION SPECIAL SPECIFICATION

SECTION 15515_S

HEATING WATER BOILER INSTALLATION

CONSTRUCTION SPECIAL SPECIFICATION

SECTION 15510_S

HEATING WATER BOILER INSTALLATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Installation of finned water tube boilers, fuel burning system, trim and controls, and boiler performance.

1.2 REFERENCES

A. ANSI Z21.13 - Gas-Fired Low-Pressure Steam and Hot Water Boilers.

B. UL-795 – Standard for Safety – Commercial/Industrial Gas Heating Equipment.

C. ASME SEC IV - Boiler and Pressure Vessels Code - Rules for Construction of Heating Boilers.

D. ASHRAE 90.1 (Most Current Edition) - Energy Standard for Buildings except Low-Rise Residential Buildings

E. ASME CSD-1 – Controls and Safety Devices Guideline for Automatically Gas Fuel Fired Boilers

F. ASME/ANSI B31.3 – ASME Code for Pressure Piping

1.3 DELIVERY, STORAGE, AND HANDLING

A. The Contractor will be required to pick-up the boilers from local Supplier. Boilers will be available for pick up by the Contractor at least two weeks prior to the specified date and contractor should plan to hold the boiler(s) in storage after that date if not ready for installation.

B. The boilers will be provided with equipment tags indicating the Owner's year of installation, and construction package. The storage boxes or crates will also be labeled with these tags.

C. Protect boilers from damage after pick-up by leaving packing in place until installation. Protect from construction dirt, dust, and debris. All water, gas and air inlet and outlet points shall be kept sealed with plugs and/or plastic.

1.4 FIELD INSTALLATION & COORDINATION REQUIREMENTS

A. Boiler combustion air ducting and flue vents will be provided and installed by the contractor. Refer to specification section 15550_S for boiler flue requirements, and sections 15810 and 15081 for combustion air ducting requirements. Boiler combustion air ducting is to be treated as indoor exposed outside-air ductwork.

1.5 START-UP SERVICE

A. The Owner has contracted with the equipment Supplier to provide a manufacturer certified maintenance technician to confirm proper installation and provide start-up and commissioning of each boiler supplied. The Contractor will be required to coordinate with the Supplier to support this effort.

B. The Owner has contracted with the equipment Supplier to provide a qualified boiler technician for Owner's onsite consultation for 1 week during the programming of the Owner's automation system to accomplish sequencing and staging of boilers. The Contractor will be required to coordinate with the Supplier to support this effort.

1.6 PERMITS

A. The Owner will obtain permits for boilers.

PART 2 - PRODUCTS – (The following equipment is being provided by the Owner, but is shown here for reference).

2.1 *FINNED WATER TUBE BOILERS*

A. *General: Hot water forced draft boiler with modulating burner, finned copper tube[1,2] heat exchanger, modulating gas burning system, electronic controls, and boiler trim.*

B. *Assembly: Copper tube[1,2] heat exchanger with extruded integral fins, assembled around combustion chamber, and tested for maximum working pressure of 160 pounds per square inch for boilers over 400 mbh, and 145 pounds per square inch for boilers 400 mbh and under.*

C. *Headers: Cast iron[1,2] with tubes rolled into place.*

D. *Boiler Housing: Galvanized steel, 16 ga minimum, with factory applied baked enamel coating.*

1. *Note 1: Heat exchangers and headers on the Under 400 mbh boilers may be stainless steel or aluminum alloy metallurgy.*

2. *Note 2: Manufacturer is to provide Add Alternate pricing for 2,000 mbh boilers, for provision of heat exchangers with Cu Ni heat exchanger piping.*

2.2 *FUEL BURNING SYSTEM*

A. *Forced Draft Gas Burner: Burner with variable speed fan capable of modulation from 100% capacity down to a minimum of 25% or less capacity in 1% increments. The burner fan shall operate for pre-purge and post-purge periods before and after boiler operation. The fan shall have a differential air pressure switch to verify proper operation.*

B. *Gas supply: Modulating 24 volt gas control valve controlled to match the demand of the burner fan. Gas train is to include gas pressure regulator, manual shut-off, and any CSD-1 required safety shut-off valves, vents, controls and fittings.*

C. *Safety Controls: Provide safety controls as required by ASME CSD-1.*

2.3 *TRIM & CONTROLS*

A. *Provide boilers with ASME Section IV rated pressure safety relief set at 100 psig for boilers over 400 mbh, and 50 psig for boilers 400 mbh and under.*

B. *Provide boilers with an automatic-reset flow switch to automatically prevent burner operation when water falls below safe level or on low water flow through boiler.*

C. *Provide boilers with temperature and pressure gages on the inlet and outlet piping.*

D. *Provide boilers with pump start/stop relay capable of interrupting a control signal from the circulation pump starter. This relay shall cycle the circulating pump on at each call for heat before the burner fires. The pump shall continue operating while the burner is firing. The pump shall run for a minimum 30-second period after the burner is disabled.*

E. *Provide boilers with high temperature limit with manual reset to stop burner operation if operating conditions rise above maximum boiler design temperature.*

F. *Provide boilers with pre-wired, 24 volt, and factory assembled electric control system. Clearly identify and label all components and terminals.*

G. *Provide boilers with an audible diagnostic/alarm annunciator with silencer switch. Alarms should be generated during any boiler safety or operational deficiency.*

H. *Provide all boilers with high and low gas pressure switches wired per ASME CSD-1.*

I. *Provide boilers with one set of dry contacts for remote monitoring of all boiler fault safeties. Contacts shall close only if no boiler fault is detected.*

J. *Provide boilers with a 24VAC interposing relay for remote start/stop control of boiler by owner's facility automation system.*

K. *Boiler combustion air blower VFD shall output a 0/10VDC analog signal proportional to blower speed to the owner's facility automation system.*

L. *Provide boilers with contacts for remote manual shutdown of boiler via manual push-button (manual pushbutton by others).*

2.4 *BOILER PERFORMANCE*

A. *Boilers must have a minimum of 85% thermal efficiency.*

B. *Each boiler shall have an independent laboratory rating for Oxides of Nitrogen (NOx) of less than 30 ppm corrected to 3% O2.*

PART 3 - EXECUTION

3.1 QUANTITIES & SCHEDULE

Refer to the attached Boiler Quantities, Capacities & Delivery Schedule Spreadsheet.

3.2 SHIPPING/RECEIVING

Contractor shall pick-up boilers from the local supplier and shall document the as received condition of each boiler on a receipt checklist.

3.3 TRANSFER TO OWNER/OWNER'S SELECTED CONTRACTOR

Within the delivery window indicated in 1.3A above, the Supplier will make available the boiler(s) to Owner's selected contractor. The transfer and boiler condition at transfer will be documented on a transfer checklist (filled out by the Owner or Owner's selected contractor and agreed to by Supplier).

3.4 INSTALLATION

A. Install in accordance with NFPA 54, and all manufacturers recommendations.

B. Maintain all manufacturers recommended clearances.

C. Install boiler on concrete housekeeping base, minimum 4 inches high and 2 inches larger on each side than boiler base. Refer to Section 03300.

D. Provide connection of natural gas service in accordance with NFPA 54 (AGA Z223.1). Provide dirt leg. Verify incoming gas pressure at gas connection to boilers is within acceptable pressure range for the boilers per manufacturer's requirements.

E. Connect boiler vent and combustion air ducting per manufacturers recommendations. Pipe vent drain line to nearby floordrain, through a condensate neutralization device.

F. Pipe water relief valves lines and drain lines to nearest floor drain.

G. Pipe gas pressure relief piping through roof, following the path of the boiler flue.

H. Provide for connection to electrical service. Refer to Section 16001.

I. Provide for connection to Facility Control System. Refer to Section 13943.

J. The Owner will provide Test & Balance services. The contractor is required to assist in balancing water flow through the boilers for the following conditions:

1. With all boiler circulation pumps ON, balance flow at each boiler to the flowrates indicated on the equipment schedules.
2. With only one boiler circulation pump ON, verify flow through the boiler does not exceed manufacturers recommendations. Verify this case for each single boiler.

K. Start boiler in accordance with manufacturer's instructions and operate over full range of boiler capacity. Coordinate with other trades. Verify operation of all controls and safeties prior to releasing for final test and balance procedures.

L. Commission boilers per specification Sections 01810, and 15995.

3.5 START-UP

The Owner has contracted with the Supplier to be responsible for start-up of each boiler by factory trained technicians and to coordinate boiler start-up with contractor’s start-up of the remainder of the heating system. The Contractor will be required to coordinate with the Supplier to support this effort.

3.6 TRAINING

The Owner has contracted with the supplier to be responsible for training the maintenance staff on the preventative and corrective maintenance of the supplied boilers. Up to four separate training sessions should be provided as required to train all appropriate SNL staff. A video recording of one of the training sessions should be provided in DVD format. The Contractor will be required to coordinate with the Supplier to support this effort.

Boiler Quantities, Capacities & Delivery Schedule:

Package (FY - ##)	**Delivery Date**	**Boiler Nameplate Capacity** (mbh)	**Quantity of Boilers Required**
07-01		2,000	3
07-02		2,000	8
07-03 A		1,000	2
07-03 B		1,300	2
07-03 C		2,000	6
07-04 A		399	2
07-04 B		399	2
07-05 A		1,300	1
07-05 B		1,000	1
07-06 A		2,000	3
07-06 B		399	2
07-07		2,000	3
07-08		2,000	12
07-09		399	2
07-10		1,000	2
07-11		399	2
08-01		1,000	2
08-02		2,000	4
08-03		2,000	3
08-04 A		2,000	3
08-04 B		1,000	2
08-04 C		1,300	2
08-05 A		2,000	3
08-05 B		2,000	3
08-06		399	2
08-07		1,300	2
08-08		399	2
08-09 A		1,000	2
08-09 B		399	2
09-01		1,300	2
09-02		2,000	4
09-03 A		399	2
09-03 B		399	1
09-03 C		399	1
09-04		2,000	8
09-05		2,000	6
09-06		399	1

Note: 399 mbh boilers must be nameplated at less that 400 mbh, and the input capacity must be physically limited to below 400 mbh.

END OF SECTION